

Columbia University Bulletin

SERIES 61 · NUMBER 4 · JANUARY 28, 1961

College
of
Pharmacy

1961-1962

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Communication with the College

ADDRESS INQUIRIES TO: The Registrar, College of Pharmacy, 115 West 68th Street,
New York 23, N.Y. Office hours: Monday through Friday 9 a.m. to 5 p.m.

TELEPHONE: TRafalgar 7-1733.

Accreditation

The College of Pharmacy is a member of the American Association of Colleges of Pharmacy and is accredited by the American Council on Pharmaceutical Education.

The College of Pharmacy reserves the right to make changes at any time in the curriculum, schedule, calendar, and regulations printed in this bulletin.

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College
of
Pharmacy
1961-1962

Columbia University in the City of New York

Academic Calendar, 1961-1962

Note that Columbus Day, Lincoln's Birthday, and Washington's Birthday are not University holidays.

AUTUMN TERM

- Sept 11-14** Monday-Thursday. Registration in the degree programs.
18 Monday. Autumn term begins.
28 Thursday. Morningside Heights classes begin.
29 Friday. Last day for making changes in programs.
Nov 7 Tuesday. Election Day. Holiday.
13 Monday. Midterm date.
23-26 Thursday-Sunday. Thanksgiving Holidays.
Dec 1 Friday. Last day for filing application for degrees to be awarded in February.
24 Sunday, through January 7, 1962, Sunday. Christmas Holidays.
Jan 15-19 Monday-Friday. Midyear examinations.

SPRING TERM

- Jan 24-26** Wednesday-Friday. Registration in the degree programs.
29 Monday. Spring term begins.
Feb 1 Thursday. Last day for filing essays for M.S. degrees to be awarded in February.
5 Monday. Award of February baccalaureate degrees.
7 Wednesday. Morningside Heights classes begin.
9 Friday. Last day for making changes in programs.
Mar 1 Thursday. Last day for filing application for degrees to be awarded in June.
26 Monday. Midterm date.
April 1-8 Sunday-Sunday. Spring Holidays.
May 11 Friday. Last day for filing essays for M.S. degrees to be awarded in June.
14-23 Monday-Wednesday. Final examinations.

COMMENCEMENT

- June 3** Sunday. Baccalaureate Service.
5 Tuesday. Conferring of degrees.





ADEQUATE REFERENCE MATERIAL IS ESSENTIAL TO MODERN SCIENCE

The College of Pharmacy

The College of Pharmacy had its inception in a meeting of prominent pharmacists of the city on March 18, 1829, at which a constitution was adopted, membership conditions established, and provision made for conducting courses of lectures. It has been continuously active as a teaching institution since that time. The first lecturers were Dr. John Torrey, in physics and chemistry, and Dr. Stephen Brown, in materia medica. The College was granted a charter on April 25, 1831, and three students were awarded diplomas in that year.

For seventy-five years the College, as a completely independent institution, grew steadily in stature, having always an interest more than merely local. In 1851 delegates from the three other colleges of pharmacy then in existence were invited to meet for the purpose of considering the establishment of standards for drugs. A second meeting for the same purpose was held in Philadelphia in 1852. As a result of these meetings the American Pharmaceutical Association was established. Since 1904 the College of Pharmacy has been affiliated with Columbia University, and its educational program, in breadth and character, has reflected the benefits of the union.

The undergraduate program in pharmacy, leading to the degree of Bachelor of Science conferred by Columbia University, provides an appropriate balance of liberal arts, humanities, basic sciences, and professional courses. Electives permit the development of individual interests and talents as preparation for service in any of the many areas of pharmaceutical activity. The curriculum fulfills the education requirements for admission to the state licensing examinations throughout the country.

Since 1897 the College has also provided opportunity for graduate study and research. The present graduate programs lead to the degree of Master of Science or Doctor of Philosophy.

The College works energetically to fulfill all three aspects of its obligation as an educational institution: through its library and archives, to conserve knowledge; through its teaching, to transmit knowledge; and, through the research of its faculty members, to extend the limits of knowledge.

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Lewis N. Brown, Ph.D. *Professor Emeritus of Pharmacy*

Fanchon Hart, M.A. *Professor Emeritus of Biology*

M. Irene Bailey. *Associate Professor of Chemistry*

B.S., Nebraska, 1927; M.S., Kansas State College, 1928; Ph.D., Columbia, 1932

Lucy W. Clausen. *Assistant Professor of Microbiology*

B.S., Long Island, 1931; M.A., New York University, 1945; Ph.D., 1947

Michael M. Clay. *Associate Professor of Pharmacology*

A.B., Ohio State, 1941; B.S., Toledo, 1950; M.S., 1951; Ph.D., Ohio State, 1953

August A. Di Somma. *Associate Professor of Organic Chemistry*

A.B., Columbia, 1929; Ph.D., 1940

Alvin Galinsky. *Assistant Professor of Pharmacy*

B.S., Illinois, 1954; M.S., 1957; Ph.D., 1961

Joseph L. Kanig. *Associate Professor of Pharmacy*

B.S., Long Island, 1942; M.S., Columbia, 1949; Ph.D., New York University, 1960

E. Emerson Leuallen. *Professor of Pharmacy*

B.S., Philadelphia College of Pharmacy and Science, 1935; M.S., 1938; D.Sc., 1947

Samuel S. Liberman. *Associate Professor of Chemistry*

Ph.G., College of Pharmacy, 1925; B.S., Columbia, 1927; M.A., New York University, 1933

Matthew Lipman. *Assistant Professor of Philosophy*

B.S., Columbia, 1948; Ph.D., 1950

Louis Malspeis. *Associate Professor of Pharmaceutical Chemistry*

B.S., Rutgers, 1949; Ph.D., California, 1953

Edwin B. Matzke. *Professor of Botany*

A.B., Columbia, 1924; Ph.D., 1930

Frank J. Pokorny. *Associate Professor of Biology*

Ph.G., College of Pharmacy, 1925; Ph.Ch., Columbia, 1927; B.S., 1933; M.A., 1950

David Rittenberg. *Professor of Biochemistry*

B.S., College of the City of New York; Ph.D., Columbia, 1934

Margaret C. Staud. *Assistant Professor of Biology*

A.B., Columbia, 1940; M.A., Cornell, 1941

Abraham Taub. *Professor of Pharmaceutical Chemistry*

Ph.G., College of Pharmacy, 1920; Ph.Ch., Columbia, 1921; B.S., 1922; M.A., 1927

Harry B. van Dyke. *David Hosack Professor of Pharmacology*

B.S., Chicago, 1918; Ph.D., 1921; M.D., Rush Medical College, 1923

George D. Zografi. *Assistant Professor of Pharmacy*

B.S., Columbia, 1956; Ph.D., Michigan, 1960

Marcel Bardon, Ph.D. *Lecturer in Physics*

Agathe Castelli, A.B. *Instructor in Biology*

Barry H. Dash, Ph.D. *Lecturer in Cosmetic Technology*

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The Bachelor of Science Program

The undergraduate program is one of five academic years, representing two years of preprofessional study and three years of professional study. It leads to the degree of Bachelor of Science in pharmacy conferred by Columbia University. Candidates may either enroll in the College of Pharmacy for the entire program or, after completing up to two years of preprofessional studies elsewhere, enroll in the College for the remainder of their work.

To be awarded the degree, the candidate must meet the following requirements:

1. He must be of good moral character and physically fitted for the practice of pharmacy.
2. He must have completed the prescribed courses. If he was admitted with advanced standing, he must have completed at the College of Pharmacy the equivalent of at least one academic year of full-time study.
3. He must have achieved passing grades in all required subjects and must have maintained the quality-point average required for advancement and for graduation.
4. He must have discharged all financial obligations to the College.

► ADMISSION REQUIREMENTS AND PROCEDURE

Both men and women are eligible for admission. An applicant must be in good health and must show evidence of good character. His secondary-school record must include at least 16 units of work completed in an approved four-year high school or the equivalent, thereby satisfying the requirements of the New York State Education Department for admission to the study of pharmacy. The following preparation is recommended:

	<i>Units</i>
English literature and composition	4
American history and social studies	2
Elementary algebra	1
Intermediate algebra	$\frac{1}{2}$ –1
Plane geometry	1
Foreign language (one)	2
Chemistry	1
Academic electives	4–4½
	16

It is most desirable for the applicant to include, as electives, additional work in science (biology, physics) and in mathematics (trigonometry, advanced algebra). Additional work in the chosen foreign language is also desirable.

A candidate whose preparation differs from that suggested above will be considered for admission if his scholastic record warrants it.

ADMISSION PROCEDURE

Requests for application forms should be addressed to the Office of Admissions, Columbia University College of Pharmacy, 115 West 68th Street, New York 23, N.Y. The completed application, including the information to be supplied by the secondary school, should be filed before June 1 of the calendar year in which the applicant plans to begin his course work. The application may be submitted after the completion of six terms of secondary school studies. This is desirable where the applicant has completed the mathematics and science requirements for admission and has demonstrated superior scholastic achievement.

All candidates are required to participate in the morning Scholastic Aptitude Test and in the afternoon achievement tests in intermediate mathematics and in chemistry which are administered by the College Entrance Examination Board. For information about these tests and for the application form, the candidate should write to the College Entrance Examination Board, Box 592, Princeton, N. J. The identification number assigned to the Columbia University College of Pharmacy is 2103.

Each candidate must also file a medical and physical examination form which is to be completed by his personal physician.

An applicant who is accepted for admission must pay a commitment fee of \$50. This fee is credited to tuition if the applicant registers for the term to which he has been admitted; it is not refundable if the applicant withdraws.

Applicants are cordially invited to visit the College of Pharmacy for a conference with the Director of Admissions. Appointments may be made in advance by letter or by telephone (TRafalgar 7-1736).

ADMISSION WITH ADVANCED STANDING

Advanced standing may be granted to an applicant who has completed course work in an accredited college or university. Candidates for admission with advanced standing should have satisfied all requirements for admission to the Bachelor of Science program. The applicant should file an advanced standing application form. The academic credentials to be submitted include an official transcript of secondary school studies and an official transcript of the college record, together with a certificate of honorable dismissal, or one indicating that the candidate is entitled to honorable dismissal, from each college attended. Each document must be sent directly from the Registrar's Office of the school which the candidate has attended to the Office of Admissions of the Columbia University College of Pharmacy. A marked catalogue showing courses completed in the college or university should be submitted for purposes of evaluation. No credit may be given for any course in which a grade lower than C (or its equivalent) has been earned.

Special requirements for admission to the second preprofessional year: A candidate who has completed at least 30 semester hours (points) of course work in an accredited college or university may be admitted with advanced standing to the second preprofessional year, provided courses in general chemistry and qualitative analysis (at least 8 semester hours) and college mathematics (6 semester hours) are included.

Special requirements for admission to the professional program: An applicant who has completed at least 60 semester hours (points) of course work in an accredited

college or university may be admitted to the first year of the professional program, provided he has completed the following courses (or their equivalents) with acceptable grades:

	<i>Points</i>
General chemistry and qualitative analysis	8
Biology (botany-zoology)	6
Mathematics	6
Organic chemistry	8
General physics	8
English literature and composition	6

The balance of the 60 points (semester hours) required should be taken in additional work in the subjects named above and in the social sciences, in a foreign language, and in literature and the fine arts.

ADMISSION BASED ON FOREIGN STUDY

An applicant whose academic preparation was completed in schools outside of the United States of America must have received approval of his educational experience from the New York State Education Department before consideration can be given to the application. The admission procedure is as follows:

1. Collect original scholastic credentials and have photocopies prepared, in duplicate.
2. Have certified translations made of these credentials (if in a language other than English). These should be in duplicate.
3. Arrange to have Form F-PH completed in its *entirety* and in duplicate.
4. File the completed Form F-PH, original scholastic credentials, certified translations, photocopies of credentials, and any other pertinent documents with Office of Admissions, College of Pharmacy, Columbia University, 115 West 68th Street, New York 23, N.Y.

If the mails are used, please send documents by *registered mail*.

► THE FIVE-YEAR CURRICULUM

FIRST YEAR		<i>Class Hours</i>	<i>Lab Hours</i>	<i>Points</i>
Chemistry 9-10	General chemistry and qualitative analysis	4	6	12
English A1-A2	English	3		6
Humanities 16	Introduction to fine arts	3		3
Mathematics 7-8	Mathematical analysis	3		6
Philosophy 1	Introduction to philosophy	3		3
SECOND YEAR				
Botany 24	Botany	2	4	4
Chemistry 27-28	Organic chemistry	3	4	10

		<i>Class Hours</i>	<i>Lab Hours</i>	<i>Points</i>
SECOND YEAR (Continued)				
Contemporary Civilization 1 and 2	Contemporary civilization A and B	4		8
Physics 21-22	General physics	3	2	8
Zoology 23	Zoology	2	4	4
THIRD YEAR				
Biochemistry 32	Biochemistry	3	3	4
Chemistry 37	Quantitative inorganic analysis	3	4	5
Chemistry 38	Pharmaceutical analysis	2	4	4
Economics 30	Principles of economics	3		3
Pharmacognosy 39	Pharmacognosy	3	3	4
Pharmacy 31	Pharmacy orientation	1	0	1
Pharmacy 33-34	Physical pharmacy, I and II	3	4	10
Pharmacy Administration 35	Business law principles	2		2
Pharmacy Administration 36	Accounting principles	2		2
FOURTH YEAR				
Humanities 41	Literature of the Western world	4		4
Humanities 42	Introduction to music	3		3
Microbiology 43	Microbiology and public health	4	4	6
Microbiology 44	Parasitology and mycology	2	3	3
Pharmacy 45	Dispensing pharmacy, I	3	5	5
Pharmacy 46	Physical pharmacy, III	3	3	4
Physiology 48	Human physiology	4	3	5
	Electives			6
FIFTH YEAR				
English 53*	Effective communication	3		3
Pharmacology 57-58	Pharmacology	3	3	8
Pharmacy 51	Dispensing pharmacy, II	2	3	3
Pharmacy 55-56	Pharmacy and chemistry of medicinals	3		6
Pharmacy Administration 54	Pharmaceutical law	3		3
	Electives			9-12

* May be taken in either the fourth or the fifth year.

► COURSES OF INSTRUCTION

HOW COURSES ARE NUMBERED

Odd numbers signify autumn-term courses.

Even numbers signify spring-term courses.

Two hyphenated numbers, one odd and the other even, signify a course that runs through both terms. The first half is prerequisite to the second half unless the course description says otherwise.

An *R* preceding a course number “reverses” the term in which the course is given. For instance, the autumn-term course *Pharmacy 53* (odd number) becomes *Pharmacy R53* when given in the spring term.

POINTS OF COURSE CREDIT

The number of points of credit a course carries *per term* is given in boldface type on the right margin of the course entry.

The University reserves the right to withdraw or modify the courses of instruction or to change the instructors at any time.

FIRST YEAR

Chemistry 9–10. General chemistry and qualitative analysis. 6 pts.

Three hours lecture, five hours laboratory, and one hour conference. Professor Bailey, Mr. Jacobs, and assistants.

The fundamental principles of chemistry, with emphasis on the theoretical aspects; the basic theory of qualitative analysis and the reactions involved in the separation and identification of the more common ions.

English A1–A2. English. 3 pts.

Three hours lecture. Mr. Levin.

Rhetoric and usage; analysis of literary forms; selected readings in British and American literature.

Humanities 16. Introduction to fine arts. Spring. 3 pts.

Three hours lecture. Professor Lipman.

A historical and comparative survey of world art, including architecture, painting, and sculpture. Lectures, class discussion, and color slides.

Mathematics 7–8. Mathematical analysis. 3 pts.

Three hours lecture. Mr. Fleshler.

Autumn term: selected topics from college algebra and trigonometry essential as a preparation for analytic geometry and calculus. Spring term: elements of analytic geometry and calculus.

Philosophy 1. Introduction to philosophy.**Autumn. 3 pts.**

Three hours lecture. Professor Lipman.

Fundamental problems in social, political, and ethical philosophy, with class discussion based upon the arguments developed by classical and contemporary philosophers.

SECOND YEAR**Botany 24. Botany.****Spring. 4 pts.**

Two hours lecture, four hours laboratory. Professor Pokorny, Miss Kelz, and assistants.

The morphology, histology, cytology, genetics, and certain physiological processes of the higher plants. The evolutionary development of plant life, shown through a study of the different phyla.

Chemistry 27–28. Organic chemistry.**5 pts.**

Three hours lecture, four hours laboratory. Professor Di Somma, Mr. Jacobs, and assistants.

Prerequisite: *Chemistry 10*.

A comprehensive course in elementary organic chemistry, based on modern theoretical principles. Synthesis and reactions of the different classes of organic compounds in the aliphatic and aromatic series, including applications to medicinal compounds.

Contemporary Civilization 1. Contemporary civilization A.**Autumn. 4 pts.**

Four hours lecture. Professor Lipman.

The main streams of thought and action which have contributed to the development of Western civilization. Readings of original works which have been and are of social or cultural importance, including those of Aristotle, Aquinas, Luther, Galileo, and Rousseau.

Contemporary Civilization 2. Contemporary civilization B.**Spring. 4 pts.**

Four hours lecture. Professor Lipman.

Our present-day society as viewed and appraised by the social sciences, with emphasis on the impact of technology and industrialization, the distribution of economic powers, the relationships between society and the individual, and kinds of social organization and disorganization. Readings include selections from Freud, Dewey, Gandhi, Galbraith, Riesman, and others.

Physics 21–22. General physics.**4 pts.**

Two hours lecture, two hours laboratory, and one hour conference. Dr. Bardon and assistants.

Prerequisite: *Mathematics 8* or the equivalent.

An introductory course on the results, methods, and spirit of the science.

Zoology 23. Zoology.**Autumn. 4 pts.**

Two hours lecture, four hours laboratory. Professor Staud, Mrs. Castelli, and assistants.

An introductory survey of the general principles of the zoology, taxonomy, anatomy, physiology, and development of animals. The structure of representative types, and microscopic and macroscopic observations, dissections, and demonstrations, with special emphasis upon the vertebrates.

THIRD YEAR**Biochemistry 32. Biochemistry.****Spring. 4 pts.**

Three hours lecture, three hours laboratory. Mr. Mandel.

Prerequisite: *Chemistry 28*, *Chemistry 37*, *Zoology 23*, or their equivalents.

An introductory course in biochemistry on certain aspects of enzymes and the intermediary metabolism of carbohydrates, lipids, proteins, and nucleic acids.

Chemistry 37. Quantitative inorganic analysis. Autumn. 5 pts.

Three hours lecture, four hours laboratory. Professor Liberman, Miss DeLisser, and assistants.

Prerequisite: *Chemistry 10, Mathematics 8, Physics 22*, or their equivalents.

Discussion of the theory and chemical calculations of inorganic quantitative analysis. Laboratory work: the important volumetric and gravimetric methods.

Chemistry 38. Pharmaceutical analysis. Spring. 4 pts.

Two hours lecture, four hours laboratory. Professor Taub and assistants.

Prerequisite: *Chemistry 28 and Chemistry 37*, or their equivalents.

Basic procedures for the qualitative and quantitative examination of official organic medicinals and pharmaceutical preparations.

Economics 30. Principles of economics. Spring. 3 pts.

Three hours lecture. Instructor to be announced.

Prerequisite: *Contemporary Civilization 2* or the equivalent.

A survey of the development of modern economic systems, with particular emphasis on corporate capitalism. The social setting, and problems and potentialities of production, distribution, and consumption.

Pharmacognosy 39. Pharmacognosy. Autumn. 4 pts.

Three hours lecture, three hours laboratory. Professor Pokorny, Miss Kelz, and assistants.

Prerequisite: *Botany 24, Chemistry 28*, or their equivalents.

Biochemical constituents of the official and certain nonofficial drugs of plant and animal origin, including plant hormones, antibiotics, allergens, insecticides, and related topics. Laboratory work: the microchemistry and microscopy of certain selected drugs, including the application of the techniques of micrometry, chromatography, and polarized light.

Pharmacy 31. Pharmacy orientation. Autumn. 1 pt.

One hour lecture. Professor Leuallen.

The development of the profession and discussion of areas of service. Introduction to relationships with the public and with other professions.

Pharmacy 33. Physical pharmacy, I. Autumn. 5 pts.

Three hours lecture, four hours laboratory. Professor Zografi and assistants.

Prerequisite: *Chemistry 28, Physics 22*, or their equivalents.

Fundamental physicochemical principles involved in pharmaceutical processes and their application to official products.

Pharmacy 34. Physical pharmacy, II. Spring. 5 pts.

Three hours lecture, four hours laboratory. Professor Zografi and assistants.

Prerequisite: *Chemistry 37, Pharmacy 33*, or their equivalents.

Principles of physical chemistry as applied to pharmaceutical systems.

Pharmacy Administration 35. Business law principles. Autumn. 2 pts.

Two hours lecture. Mr. Horowitz.

An introductory course on the nature and function of the legal system: basic concepts and rules in special areas, such as civil wrongs, contracts, agency, property, and business organizations including corporations. For guidance in avoidance of legal difficulties, in recognition of legal problems, and in better utilization of legal personnel and institutions.

Pharmacy Administration 36. Accounting principles. Spring. 2 pts.

Two hours lecture. Mr. Horowitz.

An introductory course on the basic theory of recording and reporting financial transactions, with emphasis on the evaluation and utilization of financial data for managerial purposes.

FOURTH YEAR

Humanities 41. Literature of the Western world. Autumn. 4 pts.

Four hours lecture. Instructor to be announced.

A survey of significant examples of world literature, with special emphasis upon Greek and Elizabethan drama, English poetry, and French, Russian, British, and American fiction.

Humanities 42. Introduction to music. Spring. 3 pts.

Three hours lecture. Instructor to be announced.

Aims at assisting the student both to understand and to enjoy the varieties of musical expression.

Microbiology 43. Microbiology and public health. Autumn. 6 pts.

Four hours lecture, four hours laboratory. Professor Clausen and assistants.

Prerequisite: *Botany 24* and *Biochemistry 32*, or their equivalents.

General principles of microbiology and public health, with special emphasis upon the physiology of pathogenic microorganisms. Symptomatology; prophylaxis; epidemiology of the causative agents of bacterial, rickettsial, and viral infections; and laboratory methods for identification of the organisms involved. Laboratory exercises on standard methods for identification of microbial organisms, the examination of water and milk, and the testing of disinfectants and antibiotics.

Microbiology 44. Parasitology and mycology. Spring. 3 pts.

Two hours lecture, three hours laboratory. Professor Clausen and assistant.

Prerequisite: *Microbiology 43*.

The animal parasites and fungi which cause disease in man and animals. The biology, morphology, host relationships, and epidemiology of the etiological agents associated with parasitoses and mycoses.

Pharmacy 45. Dispensing pharmacy, I. Autumn. 5 pts.

Three hours lecture, five hours laboratory. Mr. Hook and assistants.

Prerequisite: *Pharmacy 34*.

An introduction to prescription-compounding, including the elements of pharmaceutical Latin. Comparison of the various dosage forms in which medication may be dispensed, with emphasis on prescriptions which require special compounding techniques and the correction of incompatibilities.

Pharmacy 46. Physical pharmacy, III. Spring. 4 pts.

Three hours lecture, three hours laboratory. Professor Kanig and assistants.

Prerequisite: *Pharmacy 45*.

Physiochemical principles as applied to advanced manufacturing and compounding techniques involving the use of newer materials, such as surface active agents and other synthetic products employed in the manufacture of dermatological vehicles.

Physiology 48. Human physiology. Spring. 5 pts.

Three hours lecture, three hours laboratory, and one hour conference. Professors Clay, Staud, and assistants.

Prerequisite: *Zoology 23* and *Biochemistry 32*, or their equivalents.

The physical and chemical processes in mammals; the cells, tissues, organs, and organ systems that carry on these processes, together with their nervous and humoral integration. Individual laboratory experiments and observations of primary physiological processes. General background for an understanding of drug action in pharmacology.

FIFTH YEAR

English 53. Effective communication A. Autumn. 3 pts.

Three hours lecture. Mr. Levin.

Prerequisite: *English A1-A2* or the equivalent.

The elements of effective speaking: organization of ideas, enunciation, diction, poise, and technique, as applied to both conversation and formal speech. Criticism of talks prepared and delivered by students.



MICROSCOPIC IDENTIFICATION OF DRUGS



ANALYSIS OF MEDICINAL PRODUCTS

Pharmacology 57–58. Pharmacology. 4 pts.

Three hours lecture, three hours laboratory. Professor Clay, Mrs. Castelli, and assistants.

Prerequisite: *Biochemistry 32* and *Physiology 48*, or their equivalents.

The physiologic effects and therapeutic uses of official and nonofficial drugs, with special emphasis on the nature of important pathologic states, and with attention to the symptomatology and treatment of effects of economic poisons.

Pharmacy 51. Dispensing pharmacy, II. Autumn. 3 pts.

Two hours lecture, three hours laboratory. Professor Kanig and assistants.

Prerequisite: *Pharmacy 46*.

Advanced compounding techniques applied to prescription practice and professional service: the use of large-scale production equipment for the manufacture of such dosage forms as compressed and coated tablets, ointments, and liquids. Individual assignments in the development of formulations and the manufacture, on a laboratory scale, of modern dosage forms.

Pharmacy 55–56. Pharmacy and chemistry of medicinals. 3 pts.

Three hours lecture. Professor Galinsky.

Prerequisite: *Biochemistry 32*, *Physiology 48*, and *Pharmacy 46*.

A systematic study of the pharmacy and chemistry of organic pharmaceutical and medicinal substances, with attention to the biochemical and pharmacological aspects.

Pharmacy Administration 54. Pharmaceutical law. Spring. 3 pts.

Three hours lecture. Mr. Kavalier.

The basic elements of the American governmental system, federal, state, and municipal, followed by a detailed analysis of legislative enactments and administrative regulations and determinations which affect pharmacy. Included are the applicable common law principles, codes of ethics, fair trade, and labor relations.

ELECTIVE COURSES

Pharmacy 71 or R71. Drug marketing

Pharmacy Administration 82 or R82. Pharmacy management

Pharmacy Administration 83 or R83. Sales promotion

Pharmacy Administration 84 or R84. Medical detailing

Pharmacy Administration 85 or R85. Departmental merchandising

Biochemistry 77 or R77. Elementary clinical analysis

Pharmacy 72 or R72. Production methods

Pharmacy 73 or R73. Sterile products manufacture

Chemistry 86 or R86. Pharmaceutical control methods

Chemistry 87 or R87. Advanced pharmaceutical analysis

Microbiology 78 or R78. Microbiological control methods

Pharmacy 74 or R74. Projects in pharmaceutical manufacturing

Pharmacy 75 or R75. Topics in pharmaceutical engineering

Pharmacy 76 or R76. Hospital pharmacy administration

Pharmacy 77 or R77. Pharmaceutical education

*Mathematics 90–91. Calculus

*Chemistry 88–89. Physical chemistry

*French, German or Russian 80–81. Foreign language

Biochemistry 79 or R79. Advanced clinical analysis

Zoology 92 or R92. Histology and tissue techniques

Zoology 93 or R93. Hematology (blood microscopy)

Zoology 94 or R94. Serology

* May be taken in the School of General Studies of the University.

► FOUR-YEAR CURRICULUM

For students enrolled before September 1960.

THIRD YEAR		<i>Class Hours</i>	<i>Lab Hours</i>	<i>Points</i>
Biology 37	Human physiology	3	4	5
Chemistry R44	Organic chemistry	3	6	6
Chemistry 66	Quantitative analysis	2	6	5
Chemistry 70	Biochemistry	3		3
Pharmacognosy 38	Pharmacognosy	3	4	5
Pharmacy 3	Contemporary pharmacy, I	1		1
Pharmacy 23-24	Dispensing pharmacy, I and II	3	4	10
Pharmacy 50	Physical pharmacy	2		2
Pharmacy R52	Pharmaceutical economics, II	3		3

FOURTH YEAR				
Biology 55 or R55	General microbiology and public health	4	6	7
Chemistry 81 or R81	Pharmaceutical analysis	2	8	6
Pharmacology 47	Pharmacology	5		5
Pharmacology 48	Pharmacology	4	3	5½
Pharmacy 26	Dispensing pharmacy, III	1	4	3
Pharmacy 49	Pharmaceutical technology, III	2	3	3½
Pharmacy 53	Pharmaceutical jurisprudence	3		3
Pharmacy 55-56	Pharmacy and chemistry of medicinals	3		6

► COURSES OF INSTRUCTION

For a key to the course listings, see page 13.

THIRD YEAR

Biology 37. Human physiology.**Autumn. 5 pts.**

Three hours lecture, four hours laboratory. Professors Clay and Staud, Mrs. Castelli, and assistants.

The physical and chemical processes in mammals; the cells, tissues, organs, and organ systems that carry on these processes, together with their nervous and humoral integration. Individual laboratory experiments and observations of primary physiological processes. General background for an understanding of drug action in pharmacology.

Chemistry R44. Organic chemistry.**Autumn. 6 pts.**

Three hours lecture, six hours laboratory. Professor Di Somma, Mr. Jacobs, and assistants.

Prerequisite: *Chemistry 4* and *R43*.

A comprehensive course in elementary organic chemistry, based on modern theoretical principles. Synthesis and reactions of the different classes of organic compounds in the aliphatic and aromatic series, including applications to medicinal compounds.

Chemistry 66. Quantitative analysis.**Spring. 5 pts.**

Two hours lecture, six hours laboratory. Professor Liberman, Miss DeLisser, and Mr. Turdiu.

Prerequisite: *Chemistry 11*.

Discussion of the theory and chemical calculations of inorganic quantitative analysis. Laboratory work: the more important volumetric and gravimetric methods.

Chemistry 70. Biochemistry.**Spring. 3 pts.**

Three hours lecture. Mr. Mandel.

Prerequisite: *Chemistry R43*.

An introduction to the study of the organic constituents of the cell and the chemical and physico-chemical processes which go on in living systems.

Pharmacognosy 38. Pharmacognosy.**Spring. 5 pts.**

Three hours lecture, four hours laboratory. Professor Pokorny, Miss Kelz, and assistants.

Prerequisite: *Biology 21* and *Chemistry R43-R44* or their equivalents.

U.S.P., N.F., and certain nonofficial drugs of plant and animal origin, considered in gross, section, and powdered form, with microchemistry and micrometry used as aids in their study and identification. Biochemical constituents and their uses. Plant hormones, antibiotics, allergens, insecticides, and related topics.

Pharmacy 3. Contemporary pharmacy, I.**Autumn. 1 pt.**

One hour lecture. Professor Leuallen.

An analysis of current activities, accomplishments, and problems of the profession.

Pharmacy 23-24. Dispensing pharmacy, I and II.**5 pts.**

Three hours lecture, four hours laboratory. Mr. Hook and assistants.

Prerequisite: *Pharmacy 17* and *Pharmacy 22*.

Autumn: an introduction to prescription-compounding, including the elements of pharmaceutical Latin, with application of the principles learned in the technology courses. Comparison of the various forms in which medication may be dispensed. Spring: prescriptions which require special compounding techniques and the correction of incompatibilities.

Pharmacy 50. Physical pharmacy.**Spring. 2 pts.**

Two hours lecture. Professor Zografi.

Prerequisite: *Chemistry R43*.

The application of fundamental physicochemical principles to pharmaceutical processes.

Pharmacy R52. Pharmaceutical economics, II.**Autumn. 3 pts.**

Three hours lecture. Mr. Robbins.

General business principles involved in the operation of a pharmacy, including management and merchandising.

FOURTH YEAR**Biology 55 or R55. General microbiology and public health.****7 pts.**

Four hours lecture, six hours laboratory. Professor Clausen and assistants.

General principles of microbiology and public health, with special emphasis on the etiological agents of disease. Epidemiology, symptomatology, therapy, and prophylaxis; and laboratory methods for the identification of the communicable diseases. Laboratory exercises on standard methods for identification of protozoan, helminthic, and bacterial organisms; the examination of water, milk, throat cultures, and sputum; and the testing of disinfectants and antibiotics.

Chemistry 81 or R81. Pharmaceutical analysis.

6 pts.

Two hours lecture, eight hours laboratory. Professor Taub, Miss DeLisser, and Mr. Turdiu.

Prerequisite: *Chemistry 44 and 66 and Physics 2.*

Typical methods of determining the purity and strength of official organic medicinals and their preparation.

Pharmacology 47-48. Pharmacology.

5 pts. (47); 5½ pts. (48)

Five hours lecture (autumn); four hours lecture, three hours laboratory (spring). Professor Clay, Mrs. Castelli, and assistants.

Prerequisite: *Biology 37* or the equivalent.

The pharmacologic action and therapeutic uses of official and nonofficial drugs, with special emphasis upon the nature of the important pathologic states. Lecture demonstrations and laboratory experiments on the pharmacologic response of important type-drugs.

Pharmacy 26. Dispensing pharmacy, III.

Spring. 3 pts.

One hour lecture, four hours laboratory. Professor Kanig and assistants.

Prerequisite: *Pharmacy 24 and 49.*

Advanced compounding techniques applied to prescription practice and professional service. Some experience in the use of large-scale production equipment for the manufacture of such dosage forms as compressed and coated tablets, ointments, and liquids. Individual assignments in the development of formulations and the manufacture, on a laboratory scale, of modern dosage forms.

Pharmacy 49. Pharmaceutical technology, III.

Autumn. 3½ pts.

Two hours lecture, three hours laboratory. Professor Kanig and assistants.

Prerequisite: *Pharmacy 22 and Chemistry R43.*

Advanced manufacturing and compounding techniques involving the use of newer materials, such as surface active agents and synthetic products employed in the manufacture of cosmetics and dermatological vehicles.

Pharmacy 53. Pharmaceutical jurisprudence.

Autumn. 3 pts.

Three hours lecture. Mr. Kavalier.

The basic elements of the American governmental system, federal, state, and municipal, followed by a detailed analysis of legislative enactments and administrative regulations and determinations affecting pharmacy. Included are the applicable common law principles, codes of ethics, fair trade, and labor relations.

Pharmacy 55-56. Pharmacy and chemistry of medicinals.

3 pts.

Three hours lecture. Professor Galinsky.

Prerequisite: *Pharmacy 24 and Chemistry R43.*

A systematic study of the pharmacy and chemistry of organic pharmaceutical and medicinal substances, with attention to biochemical and pharmacological aspects.

Graduate Study in the Pharmaceutical Sciences

Graduate study in the pharmaceutical sciences at Columbia, under the direction of the Graduate Committee of the Faculty of Pharmacy, leads to the degrees of Master of Science and Doctor of Philosophy. The requirements of the Doctor of Philosophy degree are administered by the Faculty of Pharmacy under the jurisdiction of the Graduate Faculties of the University.

Because research areas in the pharmaceutical sciences are diverse and are dependent upon basic physical and biological sciences, the graduate student is encouraged to obtain a sound background in physics, chemistry, and biology. Illustrative research problems include the design and synthesis of medicinal compounds; absorption, distribution, detoxication, and excretion of drugs; the relationships between the pharmacological activity of drugs and their chemical structures; the physicochemical properties of pharmaceutical systems; the development of methods of analysis of drugs in pharmaceutical systems; the action of drugs on the molecular level; the selective toxicity of antimicrobial agents; the isolation and elucidation of naturally occurring compounds having medicinal value; the factors influencing the stability of drugs; factors influencing the availability of drugs to the animal organism; and the like.

In planning a program of studies, students may draw on a wide selection of graduate courses offered in other departments of the University.

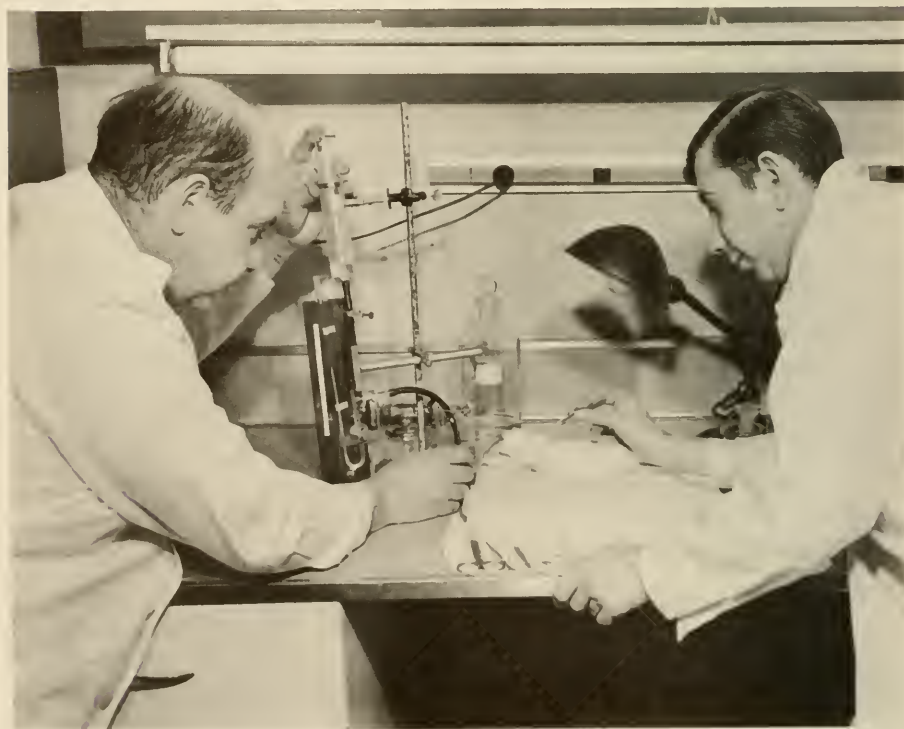
► ADMISSION AND DEGREE REQUIREMENTS

The requirements listed below are special to this department and must be read in conjunction with the general requirements of the Graduate Faculties which are listed under "Degree Requirements" in the bulletin of the Graduate Faculties (pages 43–48. A student may be admitted as a Regular Graduate Student, as an Unclassified Graduate Student, or as a Special Student in accordance with the statement regarding status listed under "Admissions" in the bulletin of the Graduate Faculties. Students who have been admitted and who wish to obtain a detailed view of the sequence of tests, oral examinations, special options, and the like, should consult the chairman of the Graduate Committee. Requirements for admission as a Regular Graduate Student are as follows:

1. The applicant must hold a baccalaureate degree from an approved institution.
2. He must have a basic knowledge of pharmacy, pharmaceutical chemistry, physics, chemistry, and biology. He must have completed course work in mathematics through differential and integral calculus.
3. He must supply official transcripts of record covering all previous college or



RADIOISOTOPES ARE USEFUL IN RESEARCH



THE STUDY OF DRUG ACTION

university study and recommendations from former instructors testifying to his outstanding training and ability.

An applicant whose undergraduate studies were undertaken in a foreign country must supply complete certified translations of all his credentials. He must be proficient in writing, reading, and speaking English. If his native language is not English, he must take the English Language Placement Examination, which is administered by the American Language Center of Columbia University. The examination will be given just before he enrolls for his first term in the College. He must also certify that he has sufficient funds with which to meet both living expenses and the expenses of graduate study.

ADMISSION PROCEDURE

Requests for application forms should be addressed to the Office of Graduate Admissions, College of Pharmacy, 115 West 68th Street, New York 23, N.Y.

New students usually begin their graduate study in September. Applicants are urged to submit their complete applications and supporting documents before February 1 of the year in which study is to begin. Later applications are considered if space and facilities permit. New students are admitted to the spring term only if facilities are available and a suitable program can be planned.

An applicant who is accepted for admission is required to furnish a \$50 commitment fee which will be applied toward tuition and other fees at the time of registration. This fee is not refundable if the applicant withdraws.

► THE MASTER OF SCIENCE PROGRAM

The candidate for the degree of Master of Science is expected to demonstrate an advanced and mature knowledge of the pharmaceutical sciences and he must meet the following requirements:

1. He must complete at least 30 points of graduate courses at Columbia University in not less than one year of resident study. All 30 points must be taken for examination credit. If, in the judgment of the Graduate Committee, his undergraduate background is incomplete, he may be required to complete more than the minimal number of units in course work. The following courses are prescribed for all students: *Pharmaceutics 121-122*, *Chemistry G4147*, *Chemistry G4127-G4128*, and a course in advanced biochemistry. An acceptable undergraduate course in physical chemistry may satisfy the requirement for *Chemistry G4127-G4128* but carries no point credit toward the degree. Any of these course requirements will be waived if, in the judgment of the Graduate Committee, equivalent work has been completed elsewhere or if the student has passed, to the satisfaction of the Graduate Committee, an examination without attending the course. The remainder of the student's program may be chosen from an approved list of elective courses offered by the Faculty of Pharmacy and other divisions of the University. The student's program is subject to the approval of the chairman of the Graduate committee.

2. He must participate satisfactorily in the graduate seminars held during his residency.

3. He must submit an acceptable essay on a topic approved by the Graduate Committee.
4. He must pass the examinations required by the Graduate Committee.

► THE DOCTOR OF PHILOSOPHY PROGRAM

A program of studies leading to the degree of Doctor of Philosophy will usually require not less than three years of full-time study. A student's candidacy for the degree must be certified by the Dean of the Graduate Faculties of the University. Application for certification can be made only after the student meets both the general requirements for candidacy, as stated in the bulletin of the Graduate Faculties, and the following specific requirements:

1. He must pass qualifying examinations administered by the Graduate Committee of the Faculty of Pharmacy.
2. He must complete at least 60 points of graduate courses, of which at least 30 must be taken at Columbia. All these courses must be taken for examination credit. The following courses are prescribed for all students: courses required for the Master of Science degree, *Pharmaceutical Chemistry 111-112* (four points), *Pharmaceutical Biology 225*, *Pharmaceutical Chemistry 207*, and *Chemistry G4133*. The balance of the program may include appropriate courses in the biological, physical, and pharmaceutical sciences under the Faculty of Pharmacy and other divisions of the University. The program must be approved in advance by the Graduate Committee.
3. He must participate satisfactorily in the graduate seminars held during his residency.
4. He must demonstrate his ability to read scientific literature in German, and in either French or Russian.
5. He must pass a comprehensive certifying examination.

Thereafter, he must complete residence and research requirements, present his dissertation, and pass a final oral examination before a committee appointed by the Dean of the Graduate Faculties. In his dissertation the candidate must demonstrate that he has made a unique contribution to the knowledge within his field of specialization.

► COURSES OF INSTRUCTION AND RESEARCH

For a key to the course listings, see page 13.

Pharmaceutical Biology 101 or R101. Microbiological control methods. 4 or 6 pts.

Two hours lecture, four or eight hours laboratory. Professor Clausen.

Prerequisite: *Biology 55* or the equivalent. Laboratory fee: \$25.

Official procedures for sterilization; tests for sterility, toxicity, and pyrogenic substances; microbiological assays of antibiotics; and identity of drug contaminants.

Pharmaceutical Biology 111–112. Applied pharmacognosy. 3 to 5 pts.

One hour lecture or conference, six to ten hours laboratory. Professor Pokorny.

Prerequisite: botany and pharmacognosy. Laboratory fee: \$25 each term.

The application of pharmacognosy to the examination of products of medicinal and economic importance.

Pharmaceutical Biology 113 or R113. Microscopical control methods. 2 pts.

One hour lecture or conference, two hours laboratory. Professor Pokorny.

Prerequisite: botany and pharmacognosy. Laboratory fee: \$10.

The microexamination of basic materials and finished products in conjunction with chemical and microbiological examinations.

Pharmaceutical Biology 121–122. Drug screening and bio-assay methods.

Four or six hours laboratory. Professor Clay. 2 or 3 pts.

Prerequisite: the instructor's permission. Laboratory fee: \$25 each term.

Standard screening techniques for the determination of toxicity and therapeutic value. The quantitative standardization of official and nonofficial drugs by biological methods, and the applications of statistical methods of analysis to biological experimentation.

Pharmaceutical Biology 225. Modes of drug action. Professors Clay, Malspeis, Galinsky, and Zografi. 3 pts. Not given in 1961–1962.

The theoretical basis for pharmacological action. The relation of the physical and chemical properties of certain drugs to their effects on cell function.

Pharmaceutical Biology 303, 304. Special problems. Points variable

The staff.

Laboratory fee: \$25.

Pharmaceutical Chemistry 101. Radioisotopes in the pharmaceutical sciences.

Autumn. 3 pts.

Two hours lecture, three hours laboratory. Professors Malspeis, Taub, and staff.

Laboratory fee: \$50. Badge: \$10.

An introduction to the properties of radioisotopes and the characteristics of radiation. Production and standardization of radioisotopes, detection and measurement of radiation, radiation dosimetry and shielding, precautions in the handling of radioisotopes, and preparation of radioisotope-labeled compounds. Radioisotopes used in medicine, sterilization with radiation and radioisotopes, and the application of radioactive tracers to research problems. Laboratory experiments include methods of radiation detection utilizing Geiger-Muller, proportional gas flow, and scintillation counters; the preparation of samples for measurement; gamma-ray spectrometry; determination of isotope distribution in living tissue; isotope dilution methods; and the application of radioisotopes to pharmaceutical research.

Pharmaceutical Chemistry 111–112. Instrumental methods of pharmaceutical analysis. 2 to 4 pts.

One hour conference, four to eight hours laboratory. Professor Taub.

Prerequisite: quantitative analysis and organic chemistry. Laboratory fee: \$25 each term.

Advanced methods of physico-chemical analysis including electrometric, optometric, and chromatographic analysis. Projects in the development of analytical procedures for complex drug mixtures.

Pharmaceutical Chemistry 122. Synthetic organic methods in medicinal chemistry. Spring. 4 to 6 pts.

Two hours lecture, four to eight hours laboratory. Professor Galinsky.

Laboratory fee: \$25.

Discussion and laboratory experimentation to illustrate the application of synthetic methods in the preparation of organic medicinal chemicals. Instrumental and other methods are used for the identification and purification of intermediates and end products.

Pharmaceutical Chemistry 207. Kinetics in pharmaceutical systems. Autumn. 2 pts.

Two hours lecture. Dr. Wolkoff.

Prerequisite: differential and integral calculus.

Rates and orders of reactions in homogeneous and heterogeneous systems; the collision theory and theory of absolute reaction rates; detailed analysis of catalysis involved in pharmaceutical systems; experimental methods; influence of temperature, light, solvent, ionic strength, and dielectric constant on reaction rates; accelerated stability analysis; oxidative and hydrolytic degradation of drugs, drug stabilization; dissolution rates; kinetics of drug absorption including distribution, biotransformation, and excretion.

Pharmaceutical Chemistry 221–222. Synthesis of biologically active compounds.

3 to 5 pts.

One hour conference, six to ten hours laboratory. Professor Di Somma.

Prerequisite: a laboratory course in synthetic organic chemistry. Laboratory fee: \$35 each term. Laboratory experimentation to determine and illustrate the best conditions for the synthesis of compounds of biological importance. Extensive use is made of the chemical literature.

Pharmaceutical Chemistry 223–224. Chemistry of natural medicinal products. 2 pts.

Two hours lecture and seminar. Professors Malspeis and Galinsky.

Structures, properties, syntheses and reactions of selected naturally occurring and related medicinal compounds, with emphasis on the methods of structure elucidation. The application of physical methods—including optical rotation; ultraviolet, visible, and infrared absorption spectra; dipole moments; and dissociation constants—to structure determination. The establishment of the stereochemistry of certain compounds by conformational analysis and other methods. The assignment of pharmacophoric groups.

Pharmaceutical Chemistry 303, 304. Special problems.

Points variable

The staff.

Laboratory fee: \$25.

Pharmaceutics 102. Dosage design and evaluation.

Spring. 2 pts.

Two hours lecture. Professor Kanig.

The variables involved in the design and manufacture of selected dosage forms and methods which are used in evaluating and standardizing their performance. The factors which influence the biological effectiveness of such dosage forms as compressed tablets, parenterals, dermatologics, timed medications, and aerosol medications.

Pharmaceutics 109–110. Industrial pharmaceutical manufacturing.

4 pts.

One hour conference, seven hours laboratory. Professor Kanig.

Laboratory fee: \$40 each term.

Experience in the formulation of pharmaceutical products through the use of industrial manufacturing equipment, with emphasis on the manufacture of compressed and coated tablets.

Pharmaceutics 121–122. New drug evaluation.

1 pt.

One hour lecture. Professors Taub and Clay.

The concept of new drugs and their relationship to public health. Criteria for the design and evaluation of experimental methods to determine the safety and efficacy of new drugs. Systems of quality control for the manufacture of new drugs.

Pharmaceutics 212. Homogeneous systems.

Spring. 2 pts.

Two hours lecture. Dr. Wolkoff.

Prerequisite: *Chemistry G4127* or the equivalent.

The physical properties of homogeneous pharmaceutical systems, in terms of modern theories of solution which utilize the properties of the liquid state as their basis. The applications of thermodynamic principles to elucidate the formation and the characteristics of ideal and real solutions and factors influencing equilibria in these solutions.

Pharmaceutics 214. Heterogeneous systems.

Spring. 2 pts.

Two hours lecture. Professor Zografi.

Prerequisite: *Chemistry G4127* or the equivalent.

Phase changes and equilibria in heterogeneous pharmaceutical systems. Theories of membrane potentials.

Pharmaceutics 215. Systems involving the interfacial state. Autumn. 2 pts.

Two hours lecture. Professor Zografi.

Prerequisite: *Chemistry G4129* or the equivalent.

Surface phenomena, including adsorption, desorption, electrokinetic potential, and surface tension. The properties of films and the colloidal state.

Pharmaceutics 303, 304. Special problems. Points variable

The staff.

Laboratory fee: \$25.

Pharmaceutical Science 301 and 302. Seminar 0 or 1 pt.

One hour seminar. The staff.

All graduate students must register for this course each term while in residence.

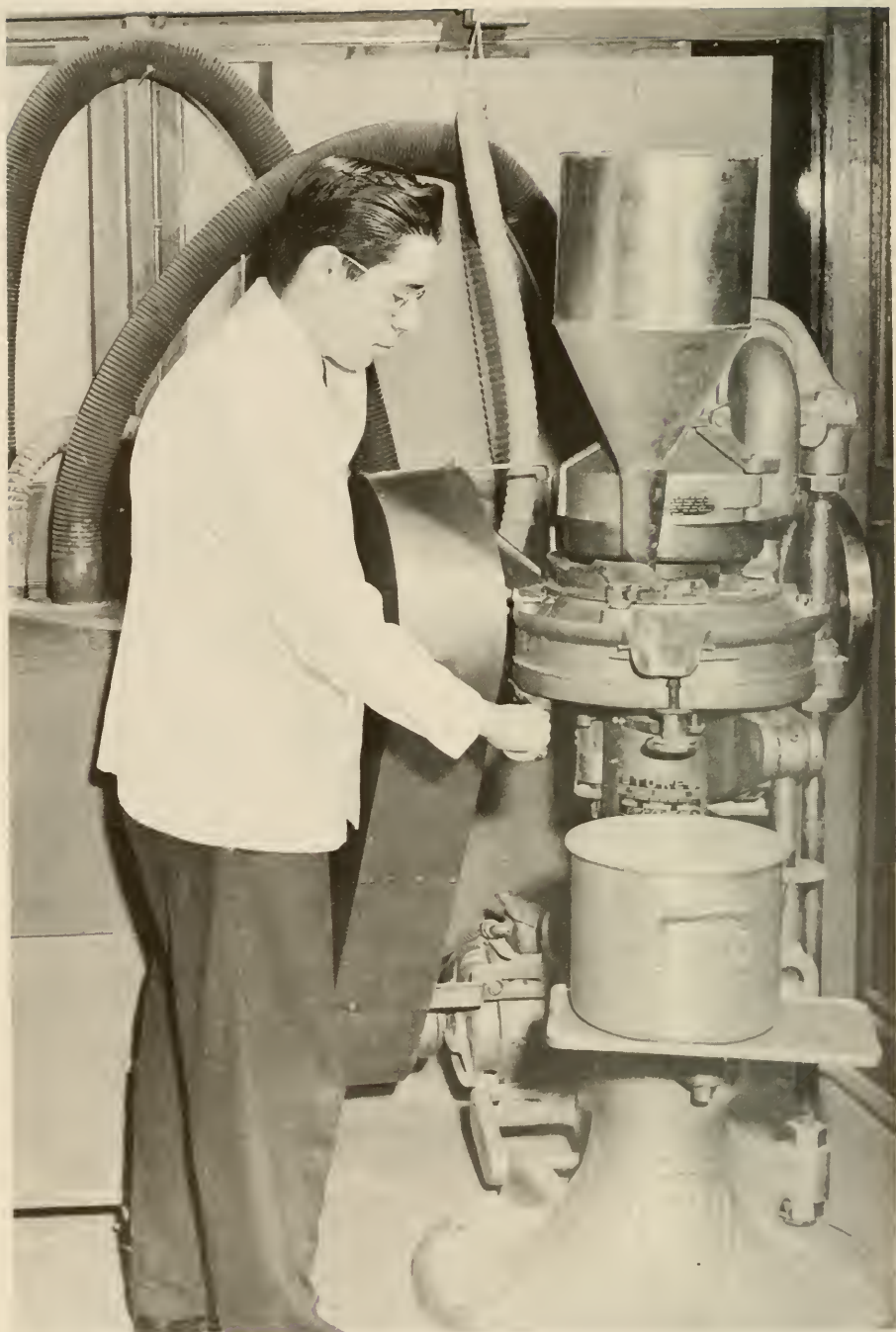
Discussion of current research in the pharmaceutical sciences.

Pharmaceutical Science 307–308. Research. Points variable

The staff.

Laboratory fee: \$25 each term.

Note: doctoral research may also be undertaken during the summer period if the Graduate Committee gives its permission.



PRODUCTION OF COMPRESSED TABLETS

Registration and Expenses

► REGISTRATION

At the beginning of each term, during the registration period stated in the Academic Calendar, each student must register in person for the courses he proposes to take during that term. He reports to the Office of the Registrar, which is open daily from 9 a.m. to 5 p.m., fills out the forms required for College records, and pays the fees.

Late registration is permitted only upon the payment of an additional fee of \$5.00 and if satisfactory cause for the delay can be shown.

A veteran who expects to have his expenses defrayed under Veterans Administration regulations must present his certificate of eligibility at the time of registration.

► FEES

The registration fee, the breakage deposit, the student activities fee, and the laboratory coat fee are payable each term as part of registration. The tuition fee may be paid in either of two ways: (1) in full at registration or (2) one half at registration and the other half at midterm (see the Academic Calendar for dates).

The following fees are subject to change at any time at the discretion of the Trustees:

Registration fee for each term	\$ 10.00
Tuition fee for either degree program, each term	500.00
(A program of less than fifteen points in the College of Pharmacy is charged for at the rate of \$35.00 per point. Courses taken in other departments of the University will be charged for at the prevailing rates.)	
Breakage deposit for each term (refundable less charges for replacement, materials, and depreciation)	
Freshmen	30.00
Upperclassmen	55.00
Application fee for a degree	20.00
Student activities fee (B.S. program only)	
Autumn term	13.00
Spring term	10.00
Badge monitoring service fee (for students using the radioisotope laboratory)	10.00
Privileges	
Registration after dates set in the Academic Calendar	5.00
Transcripts of record	1.00

Laboratory coat rental, per term (when required)	\$5.00
Laboratory gown rental, per term (when required)	7.00

ADJUSTMENT OF FEES

The registration fee, the fee for application for a degree, the commitment fee (see "Admission," page 10 or 25), and the late-registration fee are not subject to adjustment. Tuition fees will be returned only up to and including the last day for change of program, as announced in the Academic Calendar. After this day, the Registrar may authorize a partial return of tuition fees but only in cases of total withdrawal from the College. Any adjustment of tuition fees is reckoned from the day on which the Registrar receives written notice from the student. The adjusted charge for tuition is 10 per cent for each week or part thereof following the second Saturday of the autumn term or the second Saturday of the spring term up to the date on which the student officially withdraws. Consequently, when the student withdraws on or before the second Saturday of the autumn term or on or before the second Saturday of the spring term, there is no charge for tuition.

BOOKS AND SUPPLIES

It is estimated that an expenditure of \$300 will cover the cost of the textbooks and necessary apparatus required for the program leading to the B.S. degree.

► STUDENT EMPLOYMENT

Students seeking employment in retail pharmacy should consult the bulletin board in the main office. Upperclassmen and graduate students seeking summertime industrial employment should consult Professor Kanig.

► STUDENT LOAN FUNDS

A number of sources are available for loans to deserving students who have reached sophomore or higher status. Those of particular interest are the Alumni Association Scholarship Aid Fund, the Women's Auxiliary of the Pharmaceutical Society of the State of New York, the John W. Dargavel Foundation, the Women's Auxiliary of the American Pharmaceutical Association, and the National Defense Student Loan program. Tuition payment plans are also available through many New York City banks.

Complete details are available from the advisers to students.

► HOUSING

Booklets describing the University residence halls and application blanks for rooms may be obtained (for men) from the Men's Residence Halls Office, 125 Livingston Hall, Columbia University, New York 27, or (for women) from the John-

son Hall Office, 411 West 116th Street, New York 27. Rates for the academic year are \$250 to \$475 for men and \$285 to \$525 for women. Optional prepaid board plans are available in the men's residence halls. Women students living in Johnson Hall are required to take breakfast and dinner there at a cost of \$400 for the academic year.

Students who wish to live off campus should write or call at the Registry of Off-Campus Accommodations, 115 Livingston Hall, Columbia University, New York 27, for an information sheet which describes the services rendered by the Registry.

International House, a privately owned student residence near the campus, has accommodations for about five hundred graduate students, both foreign and American. Rates for the academic year are \$375 to \$700. To be eligible for admission a student must be over twenty-one and must be registered for at least twelve points or a program of full-time research. Address the Committee on Admissions, International House, 500 Riverside Drive, New York 27.

The King's Crown Hotel, 420 West 116th Street, near the campus, is owned by the University. It provides accommodations at reasonable rates for relatives and guests of members of the University community.



RESEARCH IN AEROSOL FORMULATION

Student Life

► STUDENT ORGANIZATIONS

These organizations are under the general direction of the Committee on Student Activities, which consists of members appointed from the faculty and teaching staff.

Students of the College of Pharmacy must be in good scholastic standing to be eligible to participate in competitions (athletic and nonathletic), organizations, performances, publications, and other extracurricular activities. Exceptions may be made only with the permission of the faculty.

THE STUDENT COUNCIL AND THE STUDENT BRANCH OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

The Student Council in the College of Pharmacy consists of elected representatives from the different classes. It cooperates with and is responsible to the Committee on Student Activities in the supervision of student interests and activities.

The Student Branch of the American Pharmaceutical Association at Columbia is an active professional organization. Its purpose is to bring to the attention of students the problems, advances, and other professional activities of the American pharmacist of today so that they may be better prepared to deal with these matters in the future. Guest lecturers of prominence, professional displays and exhibits, contests, and other activities are conducted by the A.Ph.A. Student Branch each year. Membership fees include subscriptions to either or both of the monthly journals published by the parent group.

The Columbia University Student Council, composed of elected representatives from the students of the schools and faculties of the University, represents the students in matters affecting the student body as a whole, with the object of promoting understanding and cooperation among the students, faculty, and administration.

FRATERNITIES AND SORORITIES

The following fraternities maintain active chapters at the College: Kappa Psi, Rho Pi Phi, Delta Sigma Theta, Alpha Zeta Omega, and Sigma Tau Epsilon. One sorority, Lambda Kappa Sigma, is active in the College.

► STUDENT COUNSELING

Student counseling is under the immediate supervision of the Associate Dean for Student Affairs, under whom two faculty members serve as advisers and consultants for each class and meet regularly with the class.

The Chaplain of the University, the three counselors—Protestant, Roman Catho-

lic, and Jewish—and the advisers to the other religious groups are available for consultation in their offices in Earl Hall on the Morningside campus.

Students are invited to attend the daily services held in St. Paul's Chapel and the meetings, lectures, and activities of the various religious organizations.

► FOREIGN STUDENTS

The Office of the Foreign Student Adviser, 103 Low Memorial Library, assists foreign students with their special problems, helps coordinate all University activities relating to foreign students, and arranges social activities.

The Office handles all questions concerning the United States Immigration and Naturalization Service and requests for all types of certification to be used for immigration, foreign exchange, and other purposes.

Informal discussion classes, planned to give a thorough orientation in American pharmacy, are conducted in the College. Selected specialists, drawn primarily from the New York area, lead discussions on retail pharmacy, industrial pharmacy, hospital pharmacy, journalism, law, organizations, and other aspects of pharmaceutical interest.

► LIBRARIES

The Libraries of the University, which are available to all students, contain nearly three million volumes, exclusive of unbound pamphlets. The main collection is housed in the Nicholas Murray Butler Library at 114th Street. The various departments of instruction have special libraries to serve their needs. The Chemistry Library in Chandler Hall, the Natural Science Libraries in Schermerhorn Hall, and the Library of the College of Physicians and Surgeons in the Medical Center at 168th Street and Broadway are of particular interest to students in the College of Pharmacy.

The library of the College of Pharmacy contains more than thirteen thousand volumes including reference works on pharmacy and allied branches of science as well as an extensive series of periodicals in English and in foreign languages relating to chemistry, pharmacy, botany, and allied sciences, including all important journals of interest to pharmacists.

Awards

The College of Pharmacy reserves the right to withhold the award of any honor, scholarship, or prize if in its opinion no candidate has exhibited qualifications justifying the award or if the amount of the accumulated income in the fund is insufficient.

Applications for the graduate fellowships must be made before April 1 on forms issued by the Office of the Dean.

GRADUATE FELLOWSHIPS

The *Bigelow Fellowship* for research in pharmacy, established through the bequest of Clarence O. Bigelow, treasurer of the College from 1897 to 1937, is awarded annually to a student who holds the baccalaureate degree from the Columbia University College of Pharmacy or from another college of pharmacy maintaining equivalent courses of study and standards. The incumbent will undertake graduate studies in the College of Pharmacy and will give a stipulated amount of teaching service. The value of the fellowship is \$1,600. Tuition fees will be remitted during the period covered by the fellowship.

The *Isaac Plaut Fellowship* for the encouragement of graduate study and original research, founded by Albert Plaut in memory of his father, Isaac Plaut, is awarded annually to that candidate for the Columbia University degree of Bachelor of Science in pharmacy who has shown during his full course of study the greatest taste and aptitude for original investigation. The choice of the institution for the graduate study and the program are subject to approval by the Faculty of Pharmacy.

The value of the fellowship is about \$1,400, the annual income of the fund. Payment will be made in two equal installments, one on September 15 and one on January 15, provided that the fellow continues faithfully to pursue the work undertaken. In case of failure to do so, he will forfeit all further privileges and emoluments conferred upon him by his appointment to the fellowship.

The *American Foundation for Pharmaceutical Education Fellowships* for graduate study in accredited colleges of pharmacy are awarded annually. Applicants must furnish evidence of acceptance for graduate study at the college they desire to enter. The grants cover tuition and include an amount for living expenses. Further information may be had from the American Foundation for Pharmaceutical Education, 1507 M Street, N. W., Washington 5, D.C.

The *Harry Taub Memorial Fellowship*, established by Mr. and Mrs. Richard Taub in memory of their son, Professor Harry Taub, for many years a member of the faculty of this College in the Department of Pharmacology, is awarded annually to a member of the senior class who is qualified to pursue graduate work at the College of Pharmacy. The value of the fellowship is about \$400, the annual income of the fund, to be applied toward the tuition fees of the graduate year.

RESEARCH FELLOWSHIPS

A number of research fellowships, provided by industrial sponsors, are available for the support of graduate student research. As a rule these fellowships are awarded only to students who have completed one year in residence.

GRADUATE ASSISTANTSHIPS

Assistantships carrying an annual stipend of \$1,600, with remission of tuition fees for graduate courses, are available to graduate students with superior qualifications. Assigned duties may have to do with specific courses or with research. Research assistantships are not generally available to first-year graduate students.

Application should be made at the time of application for admission to graduate study and annually thereafter.

SCHOLARSHIPS

The *Alexander Block Memorial Scholarship*, founded by the employees of the Block Drug Company in memory of Alexander Block (1907), is awarded annually to a student of second-year standing on the basis of character and scholastic aptitude as demonstrated during the first academic year. The value of the award is about \$100, the annual income of the fund, to be applied toward the tuition fees of the second year.

The *Borden Scholarship Award in Pharmacy*, founded by the Borden Company Foundation, Incorporated, and valued at \$300, is given annually to the student of senior standing who has achieved the highest average grade in all college work preceding the senior year.

The *Herman and Ruth Goodman Scholarship*, established by the Herman and Ruth Goodman Foundation, Inc., as a tribute to Dr. Curt P. Wimmer, beloved teacher and research worker, is awarded annually to a junior or senior student who is interested particularly in prescription pharmacy. The value of the award is \$250.

The *J. Leon Lascoff Memorial Scholarship*, founded by Dr. Frederick D. Lascoff in memory of his father, J. Leon Lascoff, Trustee, 1916–1940, and a vice-president of the College, 1940–1943, is awarded annually to a student of senior standing on the basis of excellence in all prior courses in dispensing pharmacy. This award of \$200 is to be applied toward the tuition fees of the senior year.

The *I. Neustaedter Memorial Scholarship*, founded by the Lindemann Foundation, Incorporated, as a tribute to Isidore Neustaedter, for many years a distinguished teacher in the College of Pharmacy, is awarded annually to a student of senior standing on the basis of character, scholastic aptitude, and need. The value of the award is \$300.

The *Henry Pfeiffer Scholarships*, established as a memorial to Henry Pfeiffer by the trustees of his estate, provide scholarships of \$200 each for three worthy second-year students. The scholarships are awarded on the basis of financial need, scholarly ability, and the personal qualifications of the applicant for the practice of pharmacy. They are ordinarily awarded to students for one year only, although students

of promise may receive scholarship aid in subsequent years if funds are available. Scholars receive one half of the grant at the beginning of each term, and the amount received must be applied to tuition payments. If the scholar fails to maintain an average of *B* in his studies, or if for any other reason his continued holding of a scholarship is found to be undesirable, the appointment may be terminated at the close of the respective term.

The *American Foundation for Pharmaceutical Education Scholarships* of \$200 each are awarded to two competent students of junior or senior standing in need of such support. They receive one half of the grant at the beginning of one term and the balance at the beginning of the next term, if their scholastic standing so warrants and the need continues. The funds so received must be applied toward tuition payments for the respective terms.

The *Pharmaceutical Society of the State of New York, Women's Auxiliary, Scholarship* of \$100, applicable to tuition costs of the senior year, is awarded to the student whose academic record at the end of the junior year shows the greatest improvement over that of the freshman year, in which year he must have passed all courses.

The *Revlon Foundation Scholarship*, for the purpose of encouraging interest in the scientific career opportunities in cosmetic and pharmaceutical chemistry, provides the sum of \$1,200 to a student of senior standing whose academic record is superior and whose interests qualify him for the award.

The *George J. Seabury Scholarship*, founded by Dr. Henry C. Lovis in memory of his uncle, George J. Seabury, for many years a member and patron of the College, is awarded annually to that member of the junior class who has maintained the highest standing during the three years. The value of the scholarship is about \$200, the annual income of the fund, to be applied toward the tuition fees of the senior year.

The *Trustees' Scholarships*, established by the Board of Trustees, provide scholarships of \$300 each for a limited number of new students. Similar scholarships are available to students who have completed the first year either in this college or elsewhere. Eligibility for these scholarships is based on financial need and demonstrated potential for successful scholarly attainment. These scholarships are awarded, on application, usually for a period of one academic year only, and are applicable to tuition payments. One half of the award is paid into a scholar's account at the beginning of the autumn term, and the balance at the beginning of the spring term. Scholars are expected to demonstrate scholastic achievement acceptable to the Faculty.

PRIZES

The *Samuel Abate Award*, a bronze plaque established by the Class of 1958 in memory of their beloved classmate Samuel Abate, whose death occurred during the senior year, is awarded to that student with senior status who, in the opinion of the senior class, has made the greatest contribution to promoting its welfare.

The *Alumni Association Prizes*, provided by the Alumni Fund of the College of Pharmacy, consist of a gold, a silver, and a bronze medal to be presented at Com-

mencement to the three students who have placed respectively first, second, and third in all subjects taught during the senior year.

The *Apothekan Award* of \$50, conceived by the Apothekan Staff of 1960 and supported by succeeding staffs, is given annually to the student completing his junior year whose interest in student publications has contributed most to the welfare of his class.

The *Max J. Breitenbach Prize* of \$100, accompanied by a certificate, is offered annually by the Trustees of the College of Pharmacy in memory of Max J. Breitenbach, for many years a devoted trustee, and is awarded for the highest proficiency in the senior class.

The *Bristol Award*, a copy of the Modern Drug Encyclopedia, is offered annually by Bristol Laboratories, Incorporated, to a senior who has made a substantial contribution in advancing the interests of his class.

The *Class of 1922 Samuel B. Reiman Award*, consisting of the latest edition of the United States Dispensatory suitably embossed on the cover, is presented to the president of the graduating class in memory of Samuel B. Reiman, president of the Class of 1922, who died in January, 1947, while preparing for the Twenty-fifth Anniversary of the Class, at which time a gift was to be presented to the College of Pharmacy.

The *Diekman Prize*, founded in 1930 by the Dante Circle, in honor of the late Dr. George C. Diekman, consists of a gold charm and is awarded to that graduate who has attained the highest average in theoretical pharmacy in the final year of the course.

The *Louis Dohme Prize* of \$50, founded by Ernest Stauffen in memory of Louis Dohme, is awarded annually to that student in the junior year who exhibits the best practical knowledge of the drugs of the United States Pharmacopoeia and National Formulary, as determined by the laboratory records and examination in pharmacognosy.

The *Kappa Psi Award*, a gold medal, is given annually by the Gamma Chapter of Kappa Psi to that candidate for the degree of Bachelor of Science in pharmacy who maintains the highest standing throughout the course.

The *Lehn and Fink Award*, a gold medal, offered by Lehn & Fink Products Corporation, of New York City, is awarded annually to that candidate for the degree of Bachelor of Science in pharmacy who attains the highest average in pharmaceutical analysis.

The *Leiterman Award*, a gold medal, offered annually by Miss Lillian Leiterman (1911), is awarded to that woman graduate who has maintained the highest standing throughout the course.

The *Merck Awards*, a certificate and a set of reference books, are given to the graduate who attains the highest average in pharmacology and to the graduate who attains the highest average in dispensing pharmacy.

The *New York State Pharmaceutical Society* offers a five-year membership to that graduate who, in the opinion of the class, has been foremost in promoting student welfare.

The *Olshansky Memorial Award*, a gold medal, founded by the students of the College in attendance in 1923–24, in memory of their beloved instructor, Jacob Calman Olshansky, whose death occurred in that academic year, is awarded annually to that graduate who has attained the highest average in dispensing pharmacy in the final year of the course.

The *Rexall Award*, consisting of a bronze mortar and pestle trophy, is awarded to that senior student who has gained distinction in cocurricular activities as a student in the College.

The *Rho Chi Awards*, sponsored by Beta Gamma Chapter of Rho Chi Society, the national pharmaceutical honor society, consists of six reference books, one awarded to each of the three highest ranking first-year students and to the three highest ranking second-year students, in recognition of superior scholastic achievement as indicated by the quality point average at the end of the respective academic years.

The *Rosen Award*, a United States Bond of \$50 at maturity, given by Max Rosen (1918), is awarded to the junior student who submits the best essay on merchandising or management based on his observation and experience while employed in a pharmacy.

The *E. R. Squibb Prize* of \$100, offered by E. R. Squibb and Sons in memory of Dr. E. R. Squibb, former lecturer in the College, is awarded annually to that student who exhibits the greatest proficiency in general chemistry and analytical chemistry during his freshman and sophomore years.

The *Women's Club of the Columbia University College of Pharmacy Award* consists of two prizes of \$150 each, awarded to students, one man and one woman, who have demonstrated outstanding scholarship in all courses of the first year, especially in the humanities.

Regulations

THE DEAN

The Dean is the executive officer of the faculty. It is his duty, under the direction of the President, to enforce the rules of the faculty and of the Board of Trustees and to administer discipline in the case of their violation.

STUDENTS

Each person whose registration has been completed will be considered a student of the University during the term for which he is registered unless his connection with the University is officially severed by withdrawal or otherwise. No student registered in any school or college of the University shall at the same time be registered in any other school or college, either of Columbia University or of any other institution, without the specific authorization of the dean or director of the school or college of the University in which he is first registered.

Students whose religious duties conflict at any time with academic requirements should apply to the Dean for an equitable solution.

The privileges of the University are not available to any student until he has completed his registration. Since, under the University statutes, payment of fees is a part of registration, no student's registration is complete until his fees have been paid. No student is permitted to attend any University course for which he is not officially registered unless he has been granted auditing privileges. No student may register after the stated period unless he obtains the written consent of the Dean.

ACADEMIC DISCIPLINE

The continuance of each student upon the rolls of the University, the receipt by him of academic credits, his graduation, and the conferring of any degree or the granting of any certificate are strictly subject to the disciplinary powers of the University, which is free to cancel his registration at any time on any grounds which it deems advisable. The disciplinary authority of the University is vested in the President in such cases as he deems proper and, subject to the reserved powers of the President, in the dean of each faculty and the director of the work of each administrative board.

ATTENDANCE AND LENGTH OF RESIDENCE

The minimum residence requirement for each Columbia degree is 30 points of course work completed at Columbia University. Therefore, a student who wishes to earn both a master's degree and a doctorate from Columbia University should be aware that any advanced standing awarded for graduate work completed elsewhere will not reduce the 60 points of residence credit required for obtaining both degrees.

Students are particularly requested to be in attendance at the beginning of the term in order to obtain full benefit from the course. No student will be admitted later than two weeks after the opening of the term.

Students are required to attend all classes. Absences for just cause, and without penalty, are permitted as follows: from a course meeting once weekly, twice; from a course meeting twice weekly, three times; from a course meeting three times weekly, five times; from a course meeting four times weekly, six times; from a course meeting five times weekly, seven times; and from a course meeting six times weekly, eight times. Each class meeting shall be construed as one period, whether it meets for one, two, three, or four hours. Tardiness counts as half an absence. Students are held accountable for absences incurred owing to late enrollment.

Each student is responsible for keeping a record of the date of each absence or lateness and the reason for it. A student who has had a communicable disease must report to the University Medical Officer for examination and must present to the Registrar a note of approval for readmission to classes signed by the University Medical Officer.

A student who exceeds the permitted number of absences in a course may be summoned to appear before the Dean to show why he should not be debarred from examinations in the course.

WITHDRAWAL

An honorable discharge will be granted to any student in good standing and not subject to discipline who may desire to withdraw from the University; but no student under the age of twenty-one years shall be entitled to a discharge without the assent of his parent or guardian furnished in writing to the Dean. Students withdrawing are required to notify the Registrar in writing immediately.

The Dean may, for reasons of weight, grant a leave of absence to a student in good academic standing.

EXAMINATIONS, GRADES, AND CREDITS

All courses normally close with the written examinations held in January and May (see the Academic Calendar on page 2). Apart from these examinations, the instructors having charge of the respective courses hold tests to determine proficiency. These tests constitute a part of the student's rating for report to the Registrar.

The student's performance in a course is reported according to the following grades: A, excellent; B, good; C, fair; D, poor—minimum pass; F, failure.

The grade of F is recorded by the Registrar for every course in which a student is absent from the final examination unless specific authorization to apply for a special examination is obtained by the student from the Dean's office not later than the day of the examination.

When a grade of incomplete is reported in any course, the student must arrange to complete the work before the close of the following term to receive credit.

Re-examinations are held during the periods established by the faculty. They are open upon application filed with the Associate Dean for Student Affairs for students who have been absent for imperative reasons from a final examination. Only one

re-examination is allowed in a given course. If a student fails to avail himself of the privilege of taking the stated re-examination following the completion of the course in which he is deficient, no further opportunity is afforded and a grade of F is recorded.

Each credit of work carried during a term is awarded a quality point value in accordance with the following scale: each credit of a grade of A is multiplied by 4; B by 3; C by 2; D by 1; F by 0. The sum of the quality points thus obtained, divided by the total number of credits carried, is the quality point average.

On the basis of the individual's quality point average, the faculty recommends advancement, probationary status, or dismissal for low scholarship in accordance with an index which has been established as a guide for such decisions. Recommendations for nomination to the Dean's List, for graduation, and for graduation with honors are based on the quality point average.

CREDIT FOR COURSES TAKEN OUTSIDE THE COLLEGE

Students who are duly registered in the College as degree candidates may not receive degree credit for courses completed at other institutions, including the several divisions of Columbia University, unless written approval in advance of registration for such courses is received from an appropriate officer of the College authorized by the Office of the Dean to grant such approval. Graduate students are directed to consult, in advance of registration, with the Chairman of the Graduate Committee.

HONORS

Students who demonstrate outstanding scholastic ability and personal attributes become eligible for nomination to the Dean's List, for election to Rho Chi Society, and for the several scholarships and prizes described on pages 38-41.

The Dean's List, prepared at the close of each term, bears the names of those students whose scholastic records are sufficiently outstanding to merit special recognition.

Rho Chi Society, the national pharmaceutical honor society, has as its fundamental objective the advancement of the pharmaceutical sciences through encouragement and recognition of high scholarship. Students who have achieved upper junior and senior status and whose scholarly and personal attainments have met the high standards of Rho Chi, are eligible for nomination to membership. On the same basis, the privilege may be extended to graduate students and alumni of the College of Pharmacy.

DIPLOMAS

Diplomas are issued at Commencement, in October, and in February and are granted only upon action of the faculty.

Evening Courses

Each applicant for admission to these courses must appear for an interview with the course instructor immediately preceding the registration period. The applicant's education and experience, as demonstrated in the interview, will determine whether or not he is admitted.

The tuition fee is \$35.00 a point; the registration fee is \$5.00 each term.

Pharmacy e102. Pharmaceutical and cosmetic engineering. Spring. 2 pts.

Two hours lecture. Mr. Scott.

Prerequisite: the instructor's permission.

Discussion of those engineering operations on particulate solids and liquids having wide application in the pharmaceutical industry. The theoretical and practical aspects of particle size reduction; analysis and blending as influenced by the properties of the solids. Review of important factors in rheology, fluid flow, and liquid agitation. The underlying principles of several drying operations, including spray- and freeze-drying, illustrated with practical examples.

Pharmacy e106. Fundamentals of cosmetic technology. Spring. 2 pts.

Two hours lecture. Dr. Dash and guest lecturers.

Prerequisite: general and organic chemistry or the equivalent, and the instructor's permission.

The theoretical basis and practical applications of cosmetic technology: structure and function of the skin, emulsion technology, components of cosmetics, cosmetic formulations, development and testing of cosmetics, and cosmetic packaging.

Pharmacy e107-e108. Industrial pharmaceutical manufacturing. 2½ pts.

One hour lecture and three hours laboratory. Professor Kanig and assistant.

Prerequisite: the instructor's permission. Laboratory fee: \$40 each term.

Experience in the formulation of pharmaceutical products through the use of industrial manufacturing equipment, with emphasis on the manufacture of compressed and coated tablets.

CONDENSED EVENING COURSE CALENDAR

September 18	Monday. Registration. Hours: 5:30 to 7:30 p.m.
September 28	Thursday. Autumn-term classes begin.
November 7	Tuesday. Election Day. Holiday.
November 23	Thursday, through November 26, Sunday. Thanksgiving Holidays.
December 24	Sunday, through January 7, 1962, Sunday. Christmas Holidays.
January 22	Monday, through February 1, Thursday. Final examinations.
February 5	Monday. Registration. Hours: 5:30 to 7:30 p.m.
February 7	Wednesday. Spring-term classes begin.
April 1	Sunday, through April 8, Sunday. Spring Holidays.
May 21	Monday, through May 31, Thursday. Final examinations.

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